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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/828,495 | 04/20/2004 | Julian Partridge | 254-094-CIP-4/CIP-MB | 4392 |

7590 01/11/2005

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| EXAMINER |
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TRAN, THANH Y

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| ART UNIT | PAPER NUMBER |
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2822

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/828,495

Applicant(s)

PARTRIDGE ET AL.

Examiner

Thanh Y. Tran

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4/20/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 9- 11, and 21-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Mukerji et al (U.S. 6,300,679).

As to claim 9, Mukerji discloses in figure 5 a high-density circuit module comprising: a first CSP (chip 501); a second CSP (chip 502) stacked above the first CSP (chip 501); a first form standard (mask 512) associated with the first CSP (chip 501); and a second form standard (a second form standard is a corresponding form standard (mask 512) from the other side (not shown) of chips 501, 502) associated with the second CSP (chip 502).

As to claim 10, Mukerji discloses in figure 5 a high-density circuit module comprising: flex circuitry (comprising elements 510, 511) connecting the first and second CSPs (chips 501, 502).

As to claim 11, Mukerji discloses in figure 5 a high-density circuit module wherein the flex circuitry (comprising elements 510, 511) is comprised of first and second flex circuits (a first flex circuit is a flex circuit (510, 511)) from the other left side of chips 501, 502; and a second flex circuit is a corresponding flex circuit (510, 511) from the other side (not shown) of chips 501, 502).

As to claim 21, Mukerji discloses in figure 5 a stacked circuit module comprising: a CSP (chip 501); a form standard (mask 512) attached to the CSP (chip 501); and flex circuitry (comprising elements 510, 511) attached to the form standard (mask 512).

As to claim 22, Mukerji discloses in figure 5 a stacked circuit module wherein the flex circuitry (comprising elements 510, 511) is comprised of first and second flex circuits (a first flex circuit is a flex circuit (510, 511)) from the other left side of chips 501, 502; and a second flex circuit is a corresponding flex circuit (510, 511) from the other side (not shown) of chips 501, 502).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4, 12, 16-18, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukerji et al (U.S. 6,300,679) in view of Nicewarner, Jr. et al (U.S. 5,776,797).

As to claim 1, Mukerji discloses in figure 5 a high-density circuit module comprising: a first CSP (501); a second CSP (chip 502) disposed above the first CSP (chip 501) in stacked disposition; a first form standard (mask 512) disposed, in substantial part, above the first CSP (chip 501); flex circuitry (comprising elements 510, 511) connecting the first and second CSPs

Art Unit: 2822

(chips 501, 502) and positioned to be, in part, beneath the first CSP (chip 501) and, in part, above the first form standard (mask 512) and beneath the second CSP (chip 502).

Mukerji does not disclose the flex circuitry is attached to the first form standard with at least one metallic bond.

Nicewarner discloses in figure 3 a high-density circuit module wherein a flex circuitry (40) is attached to the first form standard (46) with at least one metallic bond (bond 42 having copper) (see col. 4, lines 35-37). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the circuit module of Mukerji by using at least one metallic bond material as taught by Nicewarner to attach/bond the flex circuit to the form standard for forming interconnection between the flex circuit and the stackable modules/chips/CSPs.

As to claim 2, Mukerji discloses in figure 5 a high-density circuit module further comprising: a second form standard disposed (a second form standard is a corresponding form standard (mask 512) from the other side (not shown) of chips 501 and 502), in substantial part, above the second CSP (chip 502).

As to claims 3, 12 and 23, Mukerji discloses in figure 5 a high-density circuit module wherein the flex circuitry is comprised of a first flex circuit (a first flex circuit is a flex circuit (510, 511)) from the other left side of chips 501, 502) and a second flex circuit (a second flex circuit is a corresponding flex circuit (510, 511) from the other side (not shown) of chips 501, 502)).

Mukerji does not disclose each of the flex circuit is attached to the first form standard with at least one metallic bond.

Nicewarner discloses in figure 3 a high-density circuit module wherein a flex circuitry (40) is attached to the first form standard (46) with at least one metallic bond (bond 42 having copper) (see col. 4, lines 35-37). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the circuit module of Mukerji by using at least one metallic bond material as taught by Nicewarner to attach/bond the flex circuit to the form standard for forming interconnection between the flex circuit and the stackable modules/chips/CSPs.

As to claims 4, 16 and 24, Mukerji discloses in figure 5 a high-density circuit module further comprising: a second form standard (a second form standard is a corresponding form standard (mask 512) from the other side (not shown) of chips 501 and 502) and in which the flex circuitry (comprising elements 510, 511) is comprised of a first flex circuit (a first flex circuit is a flex circuit (510, 511)) and a second flex circuit (a second flex circuit is a corresponding flex circuit (510, 511) from the other side (not shown) of chips 501, 502)).

Mukerji does not disclose each of flex circuit is attached to the first form standard with at least one metallic bond.

Nicewarner discloses in figure 3 a high-density circuit module wherein a flex circuitry (40) is attached to the first form standard (46) with at least one metallic bond (bond 42 having copper) (see col. 4, lines 35-37). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the circuit module of Mukerji by using at least one metallic bond material as taught by Nicewarner to attach/bond the flex circuit to the form standard for forming interconnection between the flex circuit and the stackable modules/chips/CSPs.

As to claim 17, Mukerji does not disclose each of the flex circuit is attached to the first form standard with adhesive. Nicewarner discloses in figure 3 a high-density circuit module wherein a flex circuitry (40) is attached to the first form standard (46) with adhesive (bond 42 having copper) (see col. 4, lines 35-37). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the circuit module of Mukerji by using adhesive material as taught by Nicewarner to attach/bond the flex circuit to the form standard for forming interconnection between the flex circuit and the stackable modules/chips/CSPs.

As to claim 18, Mukerji discloses in figure 5 a high-density circuit module and a corresponding method comprising: providing a form standard (mask 512) providing first and second CSPs (chips 501, 502); attaching the form standard (mask 512) to the first CSP (chip 501); providing flex circuitry (comprising elements 510, 511) with an area; disposing the flex circuitry (comprising elements 510, 511) adjacent to the first form standard (mask 512) to create an area of contact.

Mukerji does not disclose the step of: applying a first metallic material to at least one part of the first form standard; and selectively applying heat to the area of contact.

Nicewarner discloses in figure 3 a high-density circuit module wherein a flex circuitry (40) is attached to the first form standard (46) with a first metallic material (bond 42 having copper); and selectively applying heat to the area of contact (see col. 4, lines 35-37). It should be noted that: when the first metallic material (bond 42) is heated to bond/attach the flex circuitry (40) to the first form standard (46), it is inherent to apply heat to the area of contact. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was

made to modify the circuit module of Mukerji by applying a first metallic material to at least one part of the first form standard; and selectively applying heat to the area of contact as taught by Nicewarner for forming interconnection between the flex circuit and the stackable modules/chips/CSPs.

5. Claims 5-8,13-15, 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukerji et al (U.S. 6,300,679) in view of Nicewarner, Jr. et al (U.S. 5,776,797) as applied to claim 1 above, and further in view of Komota (U.S. 2003/0016710).

As to claims 5, 20 and 24, Mukerji in view of Nicewarner does not disclose the metallic bond comprises at least two metals or tin and gold; the first metallic material is comprised of tin. Komota discloses a metallic bond (adhesive) comprises at least two metals (tin and gold); the first metallic material is comprised of tin (see paragraph [0058]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Mukerji in view of Nicewarner by using a metallic bond (adhesive) comprises at least two metals (tin and gold) as taught by Komota for providing a reliable bond formation because tin and gold materials have high thermal melting bond.

As to claim 6, Mukerji in view of Nicewarner does not disclose a metallic bond is created by combining a first metallic material applied to the first form standard and a second metallic material from which the flex circuitry is comprised. Komota discloses a metallic bond (adhesive) comprises tin and gold materials (see paragraph [0058]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Mukerji in view of Nicewarner by using a metallic bond (adhesive)

comprises tin (first metallic material) and gold (second metallic material) as taught by Komota for providing a reliable bond formation because tin and gold materials have high thermal melting bond.

Further, the limitation of “metallic bond is created *by combining a first metallic material applied to the first form standard and a second metallic material from which the flex circuitry is comprised*” is a process limitation in a product claim which does not otherwise patentably distinguish over prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA 1965).

As to claims 7, 8, and 15, Mukerji in view of Nicewarner does not disclose the combining of the first metallic material and the second metallic material is achieved through a selected application of heat. Komota discloses a metallic bond (adhesive) comprises tin (first material) and gold (second material) is achieved through a selected application of heat and is achieved with localized friction heating (see paragraph [0058]) (it should be noted that: when a metallic bond (adhesive) is heated it is inherently achieved through a selected application of heat and is achieved with localized friction heating). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Mukerji in view of Nicewarner by using a metallic bond (adhesive) comprises tin (first metallic material) and gold (second metallic material) as taught by Komota for providing a reliable bond formation because tin and gold materials have high thermal melting bond.

Further, the limitations of “the combining of the first metallic material and the second metallic material is achieved through a selected application of heat” in claim 7, and “the selected application of heat is achieved with localized friction heating” in claim 8, “the metallic bond is

realized by selective application of heat” in claim 15 are process limitations in product claims which do not otherwise patentably distinguish over prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA 1965).

As to claims 13 and 14, Mukerji in view of Nicewarner does not disclose the metallic bond comprises a first metallic material and a second metallic material. Komota discloses a metallic bond (adhesive) comprises a first metallic material (tin) and a second metallic material (gold) (see paragraph [0058]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Mukerji in view of Nicewarner by using a metallic bond (adhesive) comprises a first metallic material (tin) and a second metallic material (gold) as taught by Komota for providing a reliable bond formation because tin and gold materials have high thermal melting bond.

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukerji et al (U.S. 6,300,679) in view of Nicewarner, Jr. et al (U.S. 5,776,797) as applied to claim 1 above, and further in view of Chiang (U.S. 6,803,651).

As to claim 19, Mukerji et al in view of Nicewarner does not teach step of using vibration to perform the step of selectively applying heat to the area of contact. Chiang teaches the method of using vibration to perform the step of selectively applying heat to the area of contact (see col. 13, lines 7-10). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the apparatus and a corresponding method of Mukerji by using vibration method for performing heat as taught by Chiang for providing a good bonding connection which is easy to be deformed by vibration (see col. 13, lines 7-10 in Chiang).

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2; 3, 4, 11 & 12, 16, 25; 5, 13, 14, 24; 6; 9 & 10, 21; 17; 18; 20, 22; 23; and 24 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 21, 22; 23; 24; 25; 26; 30; 31; 29; and 27 of copending Application No. 10/836,855. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1, 2; 3, 4, 11 & 12, 16, 25; 5, 13, 14, 24; 6; 9 & 10, 21; 17; 18; 20, 22; 23; and 24 in the present invention having the same/similar meaning/functions/purposes as recited in claims 21, 22; 23; 24; 25; 26; 30; 31; 29; and 27 of copending Application No. 10/836,855.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Contact Information

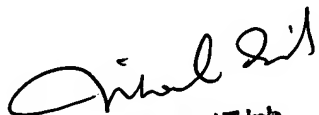
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (571) 272-2110. The examiner can normally be reached on M-F (9-6:30pm).

Art Unit: 2822

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TYT


Michael Trinh
Primary Examiner
Act SPE